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ReBioClim

D1.3.2 Local strategy and action plan for urban stream restoration in Dresden

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A. Introduction and Local Context

The ReBioClim pilot site Prohlis is located in the densely populated district of Prohlis in between 5-storey residential buildings on communal lands. The watercourse follows a straightened path. The site length of this pilot site is approximately 1090 m long. In the upper section a gallery of trees lines the banks, and the channel is deeply incised, with a width of approximately 2 meters. There is a playground and walking path besides Geberbach, which increase the socio-cultural value of the site. After about 400 m the trees disappear and lawn lines the banks. After crossing a road in a closed culvert, it flows in an open section for 500 m before disappearing in a closed culvert again.

Geberbach represents an important opportunity for urban stream restoration that can simultaneously enhance ecological quality and strengthen the role of blue-green infrastructure in the city. The city is currently in the planning phase of the revitalisation process, which includes the preparation of project documentation and restoration plan. This document is intended to support the city in the successful implementation of nature-based solutions for urban stream restoration. The Local Strategy and Action Plan (SAP) for the study area includes concrete and applicable actions developed by local partner based on the results of project deliverables, applying a multiperspective approach. The SAP will be adopted by local authorities and documented through letters of commitment.

Figure 1. Geberbach stream in Dresden

B. Summary of Specific Perspectives

This chapter shortly describes the main results of the five perspectives derived from the WP1 deliverables for the pilot site Geberbach in Dresden.

Institutional and Stakeholder Framework

Most important stakeholders

Figure 2. 121 stakeholders in total, representing 7 of 9 target groups

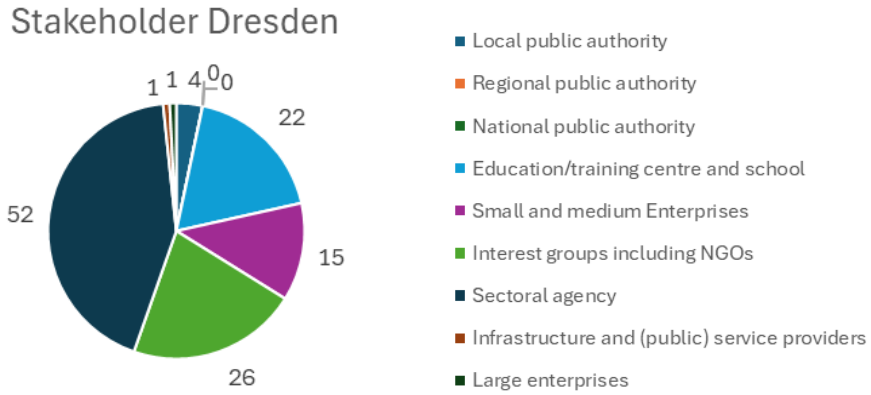


Table 1. Stakeholder role matrix

Type of stakeholder	Area of interest	Actor roles						
		Initiating	Steering and coordination	Implementing	Mediating	Financially contributing	Specialist support	Land owner
Sectoral agencies	Local	yes	yes	yes	yes	no	yes	no
Sectoral agencies	Local	yes	yes	yes	yes	no	yes	no
Sectoral agencies	Local	yes	yes	no	yes	yes	yes	no
Sectoral agencies	Local	yes	yes	no	yes	yes	yes	no
Small and medium enterprises	Regional	no	no	yes	no	no	yes	no
Small and medium enterprises	Regional	no	yes	yes	no	no	yes	no
Local public authorities	Local	no	yes	no	yes	no	yes	no
Sectoral agencies	Local	no	yes	no	yes	no	yes	no
Interest groups / NGOs	Local	no	yes	no	yes	no	yes	no
Sectoral agencies	Local	no	yes	no	yes	no	yes	no

Governance and implementation setting

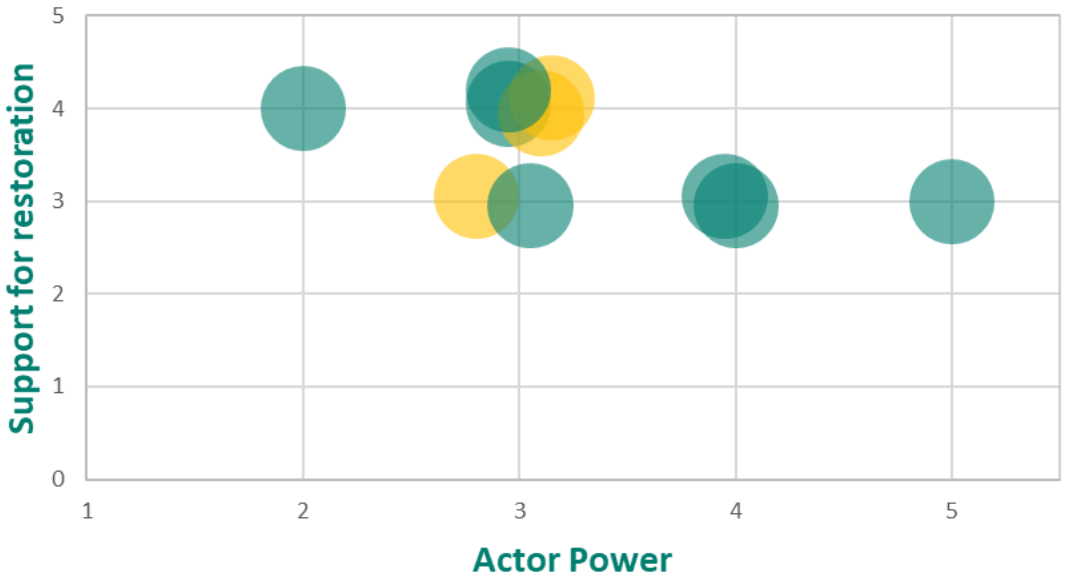
Urban stream revitalisation in Dresden takes place within a complex multi-level governance environment involving municipal authorities, sectoral agencies, technical experts and civil-society actors. The governance setting is characterised by comparatively strong institutional capacity and the presence of specialised organisations responsible for planning, water management and environmental regulation. At the same time, implementation processes are shaped by extensive administrative procedures, regulatory requirements and competing urban-development pressures.

Municipal and sectoral public actors hold the strongest influence over planning, permitting and implementation processes. These actors play central roles in project coordination, administrative management and allocation of resources, while also balancing ecological restoration objectives with flood protection, infrastructure requirements and broader urban-development priorities. Their support for revitalisation is generally positive, although often pragmatic and conditioned by procedural, financial and technical constraints.

Technical experts, planners and specialised organisations contribute important ecological and engineering expertise, particularly in relation to project design, environmental assessments and implementation planning. Civil-society actors and local initiatives provide additional support through advocacy, awareness-raising and promotion of participatory approaches, although their direct influence on formal decision-making remains limited.

Overall, the stakeholder environment in Dresden can be characterised as supportive but institutionally complex, with implementation challenges stemming primarily from administrative procedures, land-use pressures and long-term financing constraints rather than from stakeholder opposition. The distribution of stakeholder influence and support is illustrated in Figure 3.

Figure 3. Stakeholder power and support distribution indicating a generally supportive but institutionally complex governance environment in Dresden. Public-sector and sectoral actors (green bubbles) hold the strongest influence over decision-making processes, while expert and civil-society actors (yellow bubbles) contribute primarily through advisory, technical and participatory support.



Key institutional barriers and enabling conditions

The main institutional barriers identified in Dresden and the corresponding enabling conditions are summarised in Table 2.

Table 2. Key institutional barriers and enabling conditions

INSTITUTIONAL BARRIER	ENABLING CONDITION
Long and complex administrative and permitting procedures delay implementation processes	Strong institutional capacity and specialised administrative expertise within municipal and sectoral organisations
Competition for limited urban space and fragmented land ownership constrain revitalisation opportunities	Integration of revitalisation objectives into broader urban-development and climate-adaptation strategies
Dependence on unstable or project-based funding limits long-term implementation continuity	Availability of targeted national and European funding programmes supporting nature-based solutions
Technical and regulatory requirements prioritising flood protection and infrastructure protection may restrict ecological restoration measures	Growing institutional recognition of multifunctional benefits of urban stream revitalisation
Coordination challenges between multiple institutions and sectoral responsibilities complicate implementation processes	Existing cooperation between municipal departments, technical experts and environmental stakeholders

More information can be found in deliverable Project Communication Strategy and Cross-national comparative analysis of institutions and stakeholders.

Ecological Conditions

The in-stream substrate in the pilot site was mostly uniform with mostly two, sometimes three stream bed structures, like stones or dead wood. The upper part of the section is in slightly better morphological conditions in terms of shadow, bank and bed characteristics and in-stream habitats. The overall morphological index of site 2 was 2.8 which translates to “moderately anthropogenically affected” (See Renner et al. 2018).

The results of the biological monitoring indicate the potentials and stressors in Geberbach. Potentials are the community of sensitive insect-species, that profit from the riparian trees (habitats and shade), sections with gravel and stone substrates and cold, fast running water. The community is impacted by the effects of urbanization (pollution and changed flow regime) and the deeply incised channel, that reduces lateral connectivity.

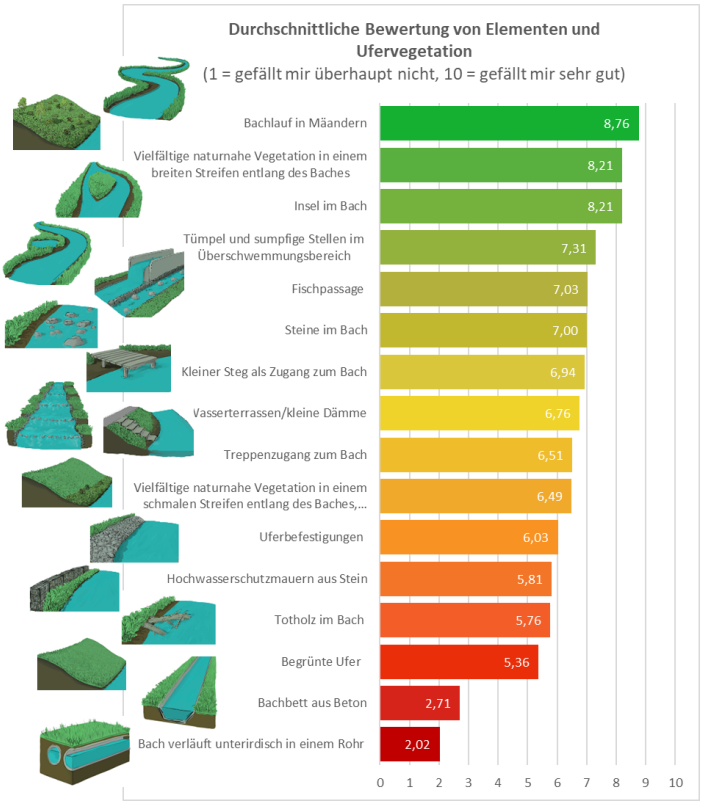
More detailed results can be found in deliverable Ecological restoration goals and the respective site reports.

Social Perspective

The face-to-face survey conducted in Dresden in 2025 focused on identifying residents' preferences for the urban stream restoration. A total of 268 valid interviews were collected in the pilot area of the Geberbach stream. Most respondents lived close to the study area, although only a small proportion had lived in the district since birth. The sample consisted of 63% women and 37% men, with an average age of 55 years. Respondents were predominantly people with vocational education, followed by university graduates, and a large proportion of the sample consisted of retirees. Results show that the area is frequently used by residents, with three quarters of respondents visiting daily or several times per week, mostly on foot. The most common reasons for visiting included **observing and experiencing nature, relaxation, passing through the area**, and **social interaction**. This confirms the importance of the Geberbach corridor as both a recreational and everyday urban space. Regarding ecosystem services, respondents considered the **creation of habitats for plants and animals, improved air quality, and a better microclimate** as the most important benefits of stream restoration.

In terms of preferences for restoration measures, respondents clearly favoured nature-based solutions such as **meanders, river islands, wetlands, fish passages, and diverse riparian vegetation**. Strongly engineered solutions, including concrete riverbeds and streams enclosed in pipes, were evaluated most negatively. The choice experiment further confirmed a general preference for natural and multifunctional stream corridors, with respondents particularly favouring **meandering streams with additional natural elements** and **accessible riverbanks**. Areas without access to water or without vegetation were generally disliked. More detailed analysis identified two main preference groups. The larger group (**63%**) strongly preferred **natural stream morphology and wide riparian vegetation**, while rejecting concrete channels. The second group (**37%**) placed stronger emphasis on **access to water and urban park surroundings**, but showed weaker preferences regarding stream morphology and vegetation structure.

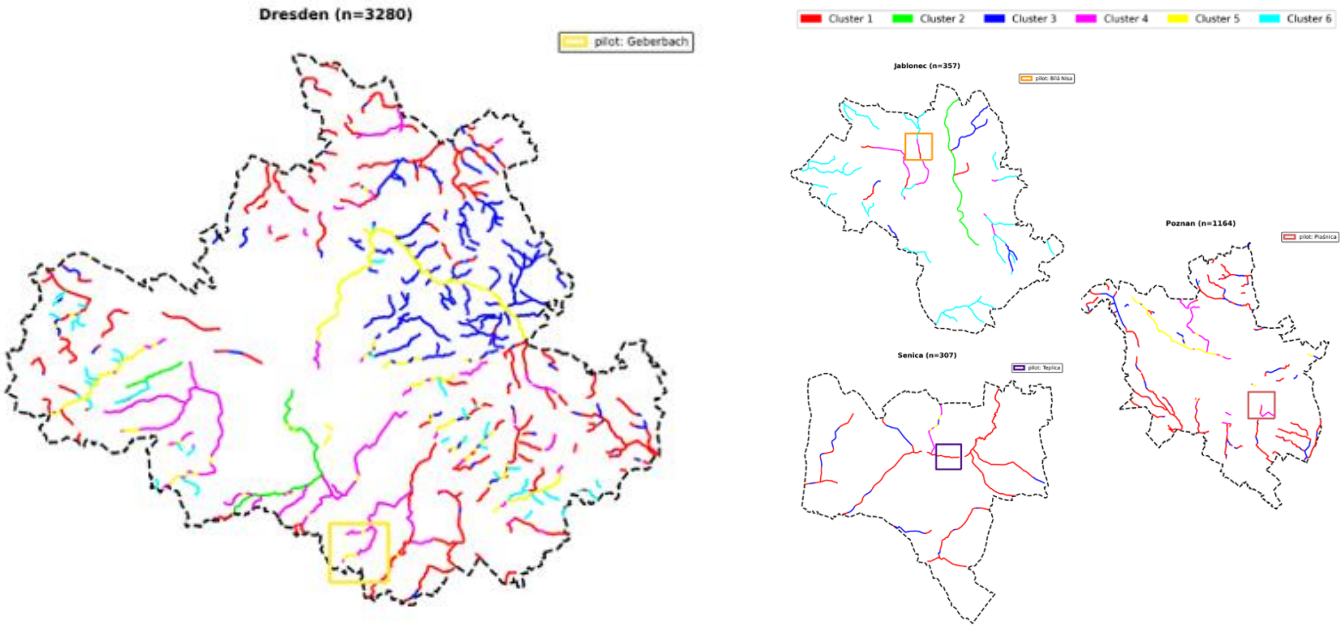
Figure 4. Average ratings of individual water features in the urban environment



Spatial Composition

All streams of the four cities were clustered into six types, based on the performance of spatial-related variables, including impervious cover, canopy cover, green land cover richness, green land cover Shannon diversity, land surface temperature, sinuosity, absolute slope, total crossings, valley depth, poi accessibility index, transport accessibility index, visibility ratio.

Figure 5. KMeans Cluster Distribution by city (k=6, 12 variables)



Regarding the characteristics of each cluster:

1 (n=2,021): High green diversity/richness, low canopy

2 (n=173): High access/crossing

3 (n=1,181): High canopy, high visibility, low diversity/richness

4 (n=716): High impervious, low visibility, high crossings, transport access, high temperature.

5 (n=302): High POI access, high sinuosity, high canopy, many crossings

6 (n=421): High valley depth, steep slope, high canopy, narrow valley

In Dresden, Cluster 1 contains more segments than any of the other clusters (33.4%). The reason is related to the heterogeneous composition of green cover in suburban Dresden. Cluster 3 takes up the second highest composition (26.2%) in Dresden. These patterns reflect stream corridors with dense and uniform tree cover type and open viewsheds that provide good visibility; in Dresden, Cluster 3 segments are primarily located in the northeastern part of the city, associated with smaller tributary streams. Cluster 4 is associated with high impervious cover, low visibility, high total crossings, high transport access, and high land surface temperature. Cluster 5 is found in corridors such as the Prießnitz stream in Dresden, which provides good access to points of interest and is intersected by multiple transportation corridors. At the variable level, many stream segments fall in the lowest impervious-cover class, including large northeastern stretches with no impervious area at all. Dresden has the largest share of highly tree-covered segments, consistent with

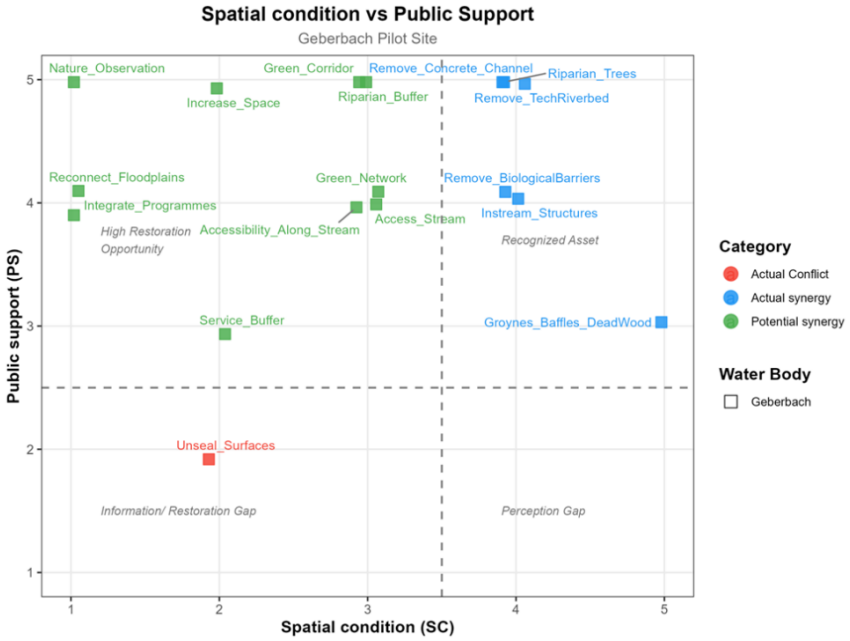
relatively low impervious cover in the same catchments. Green land-cover Shannon diversity is comparatively low, suggesting more uniform riparian green. Mean land surface temperature is 30.7°C; forested northeastern areas are around 6°C cooler than other parts of the city. Sinuosity averages 1.11, with some northwestern green reaches up to 4.0.

For the pilot Geberbach, the pilot sites are dominated by Cluster 4 segments with high impervious cover, and low visibility, combined with high total crossings, high transport access, and high land surface temperature. Compared with the other cities, Dresden stands out for hosting 72.9% of all Cluster 4 segments and 77.2% of all Cluster 5 segments, the highest mean POI accessibility, and high crossing density together with mean land surface temperature of 30.7°C. Dresden also shows relatively high absolute slope and moderate valley depths, with mean transport accessibility of 0.15 and a greater proportion of segments with moderate to high transport accessibility than in Poznań or Senica.

Synergies and Conflicts

Based on the results from Synergies and conflicts analysis, there is a great opportunity to implement more nature-based measures to restore the urban stream Geberbach and its surrounding. Dresden has already a high number (6) of measures with good performances on the related spatial conditions. It is e.g. **removing technical riverbed, riparian trees, removing biological barriers, and in-stream structures or deadwood**. Those measures are at the same time synergistic, as they are strongly supported by residents. Most restoration measures (10) are categorised as a potential synergy – they are highly supported by residents, but the related current spatial conditions are to be improved. For example, the **nature observation opportunities** are highly supported, but the current spatial condition, with the indicator of bench numbers around the streams, is very low. Two other examples are the **green corridors** and **green networks**, which have a high to very high perception. For these measures the conditions for implementing them are even better, as some green spaces already exist (medium status), thereby reducing the effort required for restoration. The actual conflict occurs for the measure **unseal surfaces**, where the spatial condition and public support are both low. From the spatial perspective, the stream corridors, especially two streams of the pilot sites in the southern Geberbach have more impervious surfaces and if the city wanted to meet environmental goals, they should be unsealed. From public support perspective, residents tend to prefer urban arrangement of greenery in the wider area of the stream, which suggests that removing impervious surfaces along the river is not a priority for them.

Figure 6. Distribution of restoration measures based on spatial condition and public support values



C. Suggestions for NBS Implementation

This chapter describes the general recommendations for nature-based urban stream restoration measures implementation based on the specific perspectives on urban restoration and synergies and conflicts analysis, and also specific and applicable actions developed for the City of Dresden for future uptake.

General recommendations

- Create more infrastructure supporting nature observation, recreation and social interaction along urban streams (e.g. benches, resting areas and educational elements).
- Reduce impervious surfaces and support the implementation of permeable and nature-based solutions, accompanied by communication activities explaining their environmental and social benefits
- Integrate revitalisation objectives into broader urban-development and climate-adaptation strategies to better balance ecological restoration with competing land-use pressures.
- Support early cross-sectoral coordination between administrative authorities, permitting bodies and infrastructure managers to streamline complex approval and implementation processes.
- Prepare and approve a long-term operational and implementation plan for future phases of the revitalisation process.
- Organise public-awareness and educational activities focused on urban stream restoration and nature-based solutions, including public screening of the film Riverbed Stories in school and community settings.
- Improve access to long-term funding by integrating revitalisation measures into broader urban-development and climate-adaptation programmes.
- Strengthen riparian buffers with strategic planting that provides shade and habitat benefits while maintaining visual openness along the stream.

Specific actions

- Integrated Water Management Plan (iGEP) Prohliser Landgraben/Geberbach
- Implementation of the measures considered in the preliminary planning for GH_I-86-03947, GH_I-86-03954.01 and GH_I-86-03954.02
- Implement the recommendations set out in the study on the water balance and discharge analysis for the Geberbach, Prohliser Landgraben and Niedersedlitzer Flutgraben
- Implementing measures from the Prohlis 2030+ Master Plan

Action n. 1	**Action name**	**Integrated Water Management Plan (iGEP) Prohliser Landgraben/ Geberbach**	
	Implementation phase	planning	
WHAT	**Action definition**	An integrated water management plan is to be drawn up for the Prohliser Landgraben/Geberbach in the State Capital of Dresden (LHDD) to identify appropriate measures for achieving the objectives set out in the European Water Framework Directive (EC WFD), as well as for the ecological enhancement of the watercourse and its role in the natural ecosystem (local recreation, species and biotope conservation, biotope connectivity, flood protection, climate regulation functions, etc.). The management plan incorporates various usage requirements for the watercourse and aligns them with desired near-natural development. Particular important is the watercourse discharge and flood protection function in relation to the reception of discharges from Stadtentwässerung Dresden (SEDD) and the Roads and Civil Engineering Office (STA) of the LHDD.	
	Scope	General ☐ Local ☑	
	Typology	☐ active intervention ☐ regulation ☐ promotion ☐ monitoring and/or research program ☐ educational program ☑ other: management plan	
	Perspective	Spatial ☑ Public ☑ Institutional ☑ Ecological ☑	
WHY	**Current status**	Not started	
	Connected restoration goal	Goals for climate adaptation and biological diversity	
WHO	**Competent stakeholders**	Environmental Office, Urban Drainage, Road and Civil Engineering Office	
HOW	**Funding options**	Municipal funds	
	Time and cost estimation	2 years, 100.000 €	
WHERE and WHEN	**Planned year and location (if relevant)**	2028	
	Indicators for monitoring	• Integrated water management plan is formally adopted into the city spatial planning	
Identified RISKS	Lack of funding	Risk mitigation measures	Look for available external funding, e.g. Support for measures to adapt to the effects of climate change

Action n. 2	**Action name**	**Implementation of the measures considered in the preliminary planning for GH_I-86-03947, GH_I-86-03954.01 and GH_I-86-03954.02**	
	Implementation phase	full restoration	
WHAT	**Action definition**	During the preliminary planning phase, measures were identified in collaboration with project partners PP1, PP2 and PP3, as well as the planning firm Haß Landschaftsarchitekten, to enhance the ecological value of the Geberbach stream and improve it as a recreational space. All measures that could not be implemented during the ReBioClim project period are to be implemented in the future: No. 2: Review of land ownership arrangements regarding the potential acquisition of the area between Geberbach and the public footpath (parcel 226) to create recreational spaces along the watercourse Nos. 4-6, 8: Restructuring of the tree population: removal of overmature, damaged trees and non-native species No. 11: Dismantling and relocation of the waste disposal site from the riparian zone No. 18: Removal of land uses and deposits in the riparian zone and on the bank; Restoration of natural bank slopes; Installation of willow fascines for bank stabilisation and structural enrichment; Supplementation of the tree and shrub fringe with site-appropriate trees and shrubs	
	Scope	General ☐ Local ☑	
	Typology	☑ active intervention ☐ regulation ☐ promotion ☐ monitoring and/or research program ☐ educational program ☐ other:……	
	Perspective	Spatial ☐ Public ☐ Institutional ☑ Ecological ☑	
WHY	**Current status**	The description of the measures is included in the preliminary planning for measures GH_I-86-03947, GH_I-86-03954.01 and GH_I-86-03954.02	
	Connected restoration goal	Goals for climate adaptation and biological diversity	
WHO	**Competent stakeholders**	Environmental Office	
HOW	**Funding options**	Waterways and Flood Protection Funding in Saxony, Financial Equalisation	
	Time and cost estimation	10 years, 150.000 €	
WHERE and WHEN	**Planned year and location (if relevant)**	2037, Prohlis and Nickern	
	Indicators for monitoring	• 7 implemented restoration actions • Enhancement of the condition of the riparian zone along stream	
Identified RISKS	Low public acceptability	Risk mitigation measures	Early public engagement through various public engagement formats

Action n. 3	**Action name**	**Implement the recommendations set out in the study on the water balance and discharge analysis for the Geberbach, Prohliser Landgraben and Niedersedlitzer Flutgraben**	
WHAT	**Action definition**	The study proposes discharge rates for the MNQ and MQ necessary to achieve good ecological conditions and maintain baseflow in Geberbach in dry periods. The necessary rates can be achieve by adopting the minimum discharge provided by the Kauscha reservoir.	
	Implementation phase	planning	
	Scope	General ☐ Local ☑	
	Typology	☐ active intervention ☑ regulation ☐ promotion ☑ monitoring and/or research program ☐ educational program ☐ other:……	
	Perspective	Spatial ☐ Public ☐ Institutional ☑ Ecological ☑	
WHY	**Current status**	Not started	
	Connected restoration goal	Reduce water abstraction, remove dams, dismantle cross-river structures/migration barriers	
WHO	**Competent stakeholders**	Environmental Office, State Dam Authority of the Free State of Saxony, Upper Water Authority (Dam Inspection)	
HOW	**Funding options**	Municipal Funds	
	Time and cost estimation	3-5 years, no costs	
WHERE and WHEN	**Planned year and location (if relevant)**	2032	
	Indicators for monitoring	• Binding adjustment and setting of the minimum water discharge is legally established by the relevant water authority • Stream maintains minimum discharge in dry period	
Identified RISKS	Low support from other stakeholders	Risk mitigation measures	Integrate various stakeholder group in the process

Action n. 4	**Action name**	**Implementing measures from the Prohlis 2030+ Master Plan**	
	Implementation phase	full restoration	
WHAT	**Action definition**	Measures I 3.1-3.2, I 4.1-4.3 and I 11.1 of the Prohlis 2030+ Master Plan relate to the Geberbach. Measures I 3.1 – 3.2 involve the renaturation of the Geberbach and the playground on the Gamigstraße site (plot 381, Prohlis). Measures I 4.1 – 4.3 describe the renaturation of the Geberbach and the improvement of accessibility as part of the Blaues Band Geberbach and the 2033 National Garden Show (BUGA) in Dresden. Measure I 11.1 aims to create retention facilities in the courtyards of the residential development.	
	Scope	General ☐ Local ☑	
	Typology	☑ active intervention ☐ regulation ☐ promotion ☐ monitoring and/or research program ☐ educational program ☐ other:……	
	Perspective	Spatial ☑ Public ☑ Institutional ☑ Ecological ☑	
WHY	**Current status**	I 3.1-3.2: currently used as a car park; the city has acquired the land I 4.1-4.3: The measure is being implemented as part of the 'Blaues Band Geberbach' project in the Dresden South-East funding area I 11.1: An evaporation basin has been constructed	
	Connected restoration goal	Creating a rain garden, ensuring access along the stream, ensuring access to the stream, climate adaptation goals	
WHO	**Competent stakeholders**	Environmental Office, Office for Urban Greenery and Waste Management, Office for Building Construction and Property Management, Office for Urban Planning and Mobility, "Glückauf" South Dresden Housing Cooperative (WGS), Urban Drainage	
HOW	**Funding options**	Riverine restoration along watercourses under the Natural Climate Protection Action Programme	
	Time and cost estimation	4 years, 80 to 100 mio €	
WHERE and WHEN	**Planned year and location (if relevant)**	2030	
	Indicators for monitoring	• 6 implemented restoration actions • improved ecological status of the stream	
Identified RISKS	Lack of funding	Risk mitigation measures	Look for available external funding, e.g. Support for measures to adapt to the effects of climate change